INST. FÖR CELLFORSKNING OCH GENETIK
MEDICINSKA NOBELINSTITUTET
KAROLINSKA INSTITUTET
STOCKHOLM 60
Telefon 23 54 80

INST. FOR CELL RESEARCH AND GENETICS
KAROLINSKA INSTITUTET
STOCKHOLM 60

Stockholm, March 27 1961

Professor Joshua Lederberg
Stanford University
Medical Center
Department of Genetics
Palo Alto, California, USA

Dear Joshua:

Thank you for your letter of March 8, which I got just when I had to leave for the radiation meetings in Geneva where I am writing this now.

Enclosed I send a bunch of curves which represent practically the entire material measured as yet, The main part of the manual measurements have been made by Mr Kudynowski who is the expert on difficult objects in our place. In the preparation of the material and also parts of the measurements two medical students have participated, Per Skånsberg and Lars Sörén together with whom I made the more detailed planning of the work as I myself have had to be away in March and will furthermore be so also in April until about the 23rd.

The curves illustrate well, I believe, what can possibly be attained in this way, and also the difficulties which meet at the measurements of objects of a size so close to the physical limit for the measurements.

One has to be very clear about these difficulties from the very beginning and I believe it is good to have a discussion on that in late April.

Attached to the paper marked I. there is a recording from the machine made on Bacterium megatherium in the way that one small spot in the center of the bacterium has been projected into the measuring diaphragn. Primary focusing at the wavelength of 254. The record gives transmission data when the wavelength is automatically changed up to 350. The second curve gives the same run without an object and the ratio between these two curves the per cent-transmission of the bacterium in the different wa-

velengths. This is the type of measurements which we call "spot measurement" (Swedish:punktmätning). The recordings attached to sheet H illustrate the second type of measurement - which we prefer in major part of the work as one gets a good control of different factors. In this case sweeps are made over an individual bacterium in different wavelengths after each other. The line along which the sweep is made is identical for all the wavelengths. Also in this case transmission is recorded. These curves are very instructive as they illustrate also the fact that we have, in the measuring situation chosen with the bacterium in physiological saline, a considerable light refraction at the edges, which has to be eliminated in some way - subject for later discussions.

The sheets A, B and C and D give curves which have been attained in the latter manner from different individuals of Bacterium megatherium, surrounded by saline. You might already have a few of these curves, as some of them were ready before I went to Stanford.

Curves on E and G give sweeps from individual E coli mounted in glycerin (in order to keep light refraction losses down). The curves reflect the more difficult measuring situation in this case where the size is still closer to the wavelength of the light used than in the case of the megatherium and several of the bumps on the curves are no doubt to be referred to errors in the measurements. The proper way ~~with~~ to deal with such situations is to try to work on groups of bacteria. Attached to sheet H you find the records from a series of sweeps over groups of bacteria preliminary data. Recorded are transmission and, the red curve, integral of extinction. This mode of work might be the most productive one, if developed a little further. By integrating the extinction in that way you can work with quite inhomogeneous objects, also with "holes" in the object.

I doubt that you will get much inspiration out of these curves - they merely show that we have been to some extent active. However, as these curves have shown pretty exactly what we expected them to do we do not continue the work on bacterial cultures but wait for the material which you promised to send and which we will start working on when it gets over to Stockholm.

I know that you have heard from the Kleins recently - I have shown them the photos of the house and the cars.

Looking forward to hearing from you about your material, I am with best personal regards,

Sincerely yours,

Torbjörn Caspersson